



# Sound and light therapy

## Realigning a person's experience of the world

**Pauline Allen**, Principal of The Sound Learning Centre in London, outlines how the Centre's therapies significantly improve those with a range of behavioural, emotional and educational difficulties as well as general well-being of the mind-body system.

**T**he power of sound has been recognised since the earliest civilisations and incorporated in many aspects of life, including religions, magic and healing. Light as a remedy is also not a new phenomenon and, before it was forgotten with the rise of modern medicine, many ancient cultures applied its healing properties.

In recent years there have been various initiatives to use both sound and light to help people with poor functioning attributed to physical, emotional, behavioural or learning difficulties. In medicine sound and light are increas-

ingly used to reduce or eliminate pain during major surgery and dentistry and to relieve joint pains. Music is also used to stimulate the overall mind-body system, for personal growth or to stimulate intellectual development.

### **What we do**

A small, private company, The Sound Learning Centre aims to help children and adults with various learning and sensory difficulties, such as dyslexia, dyspraxia, AD(H)D, autism, central auditory processing disorder (CAPD) and a range of other difficulties that

cause individuals to function below par. We specialise in the use of both sound and light and offer a comprehensive and holistic approach that differs from those offered by many other professionals.

Our non-invasive programmes address the underlying causes of learning difficulties rather than providing remedial management of symptoms. Many parents we see bring volumes of reports detailing the diagnosis of their child by health and educational authorities and professionals, often in the form of a 'label', such as dyslexia, ADHD, Asperger's syndrome or autism. A formal diagnosis of any deficiency in a child's development may be difficult to accept for the parents or carers, but is usually the only way forward to obtain additional support from doctors or schools.

These diagnoses can never adequately describe the actual condition of the child. For many parents it can be a blow to return home with such a diagnosis, thinking their child has suddenly been 're-classified' as disabled, and many are often left to themselves to find ways to help their child.

At our Centre we do not diagnose such conditions at all, but we do test and observe the individual's actual behaviour and sensory responses. We look in great detail at the hearing, vision and developmental maturity of the individual and suggest ways in which specific areas can be helped or developed further.

### **Processing our experience**

We recognise that, as we depend on our senses both to process our experiences of the world and thus learn, if they do not work to their optimum, we lose many opportunities to learn and progress.

The five direct senses – hearing, vision, touch, smell and taste – are the main receptors of information and are complemented by the indirect senses, such as the vestibular system, which consists of the parts of the inner ear and nervous system that control equilibrium, balance and orientation, together with the proprioceptive system, which enables us to know where our body is in space. How well the senses can gather and integrate information from the outside world has a great influence on how we learn and how well we function.

When sensations via one of our senses are experienced too intensely, the sense is referred to as being hyper-acute (over-sensitive) and when experienced less intensely, it is termed hypo-acute (under-sensitive). Over- or under-sensitivity will vary over time. For instance, when we are stressed and under pressure, many of us will not be able to cope

so well with too many sounds or too much visual input.

All the senses gather complex information. Our ears, for instance, are able to pick up a wide range of different frequencies, from very low tones, such as the sound of a double bass, to very high pitched sounds like that of a piccolo. In addition, the range of levels we can hear – from the quietest to the loudest we can tolerate – is vast.

From personal experience we know that changes in the way the senses receive and process external stimuli often lead to significant improvements in ability and behaviour. The acquisition of speech, for instance, is closely linked to the ability to hear sound without distortion and at the correct level. Temporary, partial deafness caused by ear infections or glue ear will impede the learning of language for that period of time. Conversely, we also see many clients with hypersensitivity to sounds who start to ignore them and ‘tune out’ in order to cope.

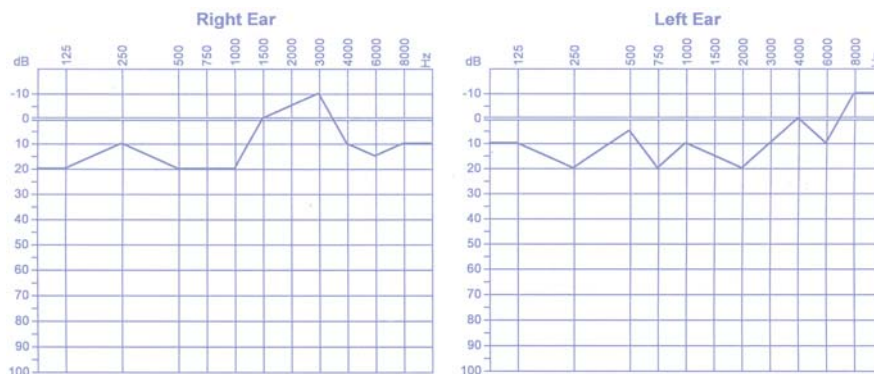
Our eyes are even more complex, with a huge number of ‘cone’ receptor-cells to pick up different frequencies which we interpret as colours, and ‘rod’ receptor-cells that process black and white images. As all our senses gather such a complexity of information, it is no wonder that even well-functioning adults often express sensory imbalances.

### Correcting imbalances

We have found that imbalances in children and adults with learning or developmental difficulties are often so great that they directly interfere with their ability to function well on a daily basis. Over-sensitive touch or tactility can lead to difficulties with wearing certain types of clothes, for instance being unable to tolerate labels in the back of shirts. Tactile and olfactory sensitivities may lead to ‘faddy’ eating or difficulties in forming relationships.

It is quite possible to be both over- and under-sensitive within one modality. This commonly occurs and can lead to confusion and very stressed sensory systems. Over-sensitivity can also lead to too much information entering the brain so it becomes overloaded, literally overwhelmed, by the sheer volume of impressions.

An imbalance in the hearing profile may show on an audiogram (a measurement of a person’s hearing pattern – see below) as changes in sensitivity to adjacent frequencies with, in many cases, a different pattern in each ear. This may cause difficulty; for instance, some vowels or some consonants may present



**Figure 1:** A typical audiogram showing a distorted hearing profile. The theoretical ideal is for the hearing threshold to be at or close to 0 dB across all frequencies for both ears.

problems, parts of words may be lost altogether, different information may be received in each ear, at different times, making it difficult to integrate, process and make sense of the whole. This, in turn, can lead to a great deal of stress, tiredness and frustration for the listener who may well take refuge by simply switching off.

Sensory processing issues underlie many forms of learning difficulties, resulting in many individuals failing to achieve their potential. Many ‘failing’ or under-achieving students get into minor trouble, leading to truancy, exclusion, educational failure and crime. Their difficulties are not normally a lack of intellect but result from sensory processing issues. Underlying learning difficulties are the

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sensory issues that make compliance with learning in a classroom situation almost impossible for some of the more severely affected students; thus they play truant and withdraw from the normal school environment because they feel ‘stupid’.

Based on our detailed sensory assessments, we are able to offer personalised treatments that can re-train a person’s senses, improve their functioning and, through this ‘back door’, change behaviour and ability. We can bypass the formal diagnosis and tackle measurable and observable elements of the sensory systems in order to effect change beyond the label.

### What an assessment entails

Our comprehensive assessment procedures include:

- A background developmental questionnaire, to build up a detailed case history that includes information about medical history and school results;
- Various hearing assessments: audio-

metric testing, laterality and selectivity tests, together with auditory discrimination and distraction tests;

- Various visual assessments: checks for possible visual perceptual difficulties, eye dominance and any possible binocular vision difficulties. The visual fields of awareness indicate how much light is being processed, not just for seeing, but for conversion to light energy to activate the body’s many regulatory systems;
- Neuro-developmental screening to check if any of the immature reflexes still remain inhibiting natural development.

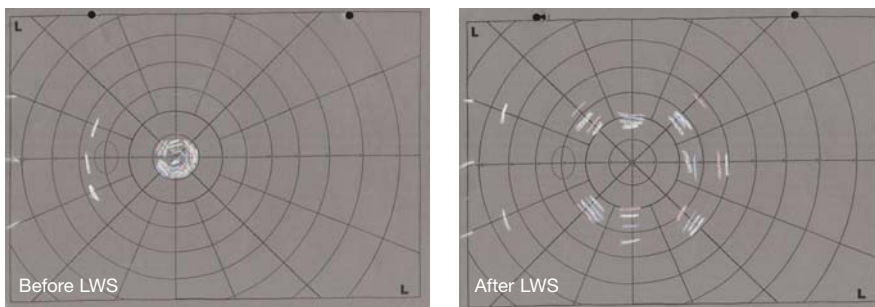
All these tests are done under one roof and reviewed to build up a complete picture of the whole person. Where possible we take further measurements, both mid-way and at the end of the process.

### Significance of the hearing profile

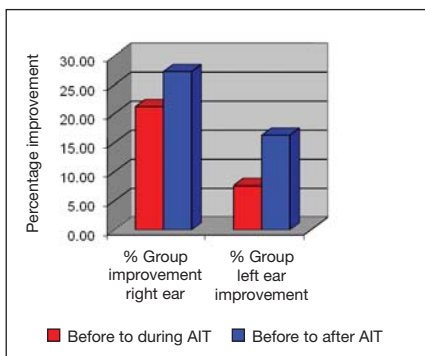
Many of those that we see have had their hearing tested and have been told that their hearing is ‘within normal limits’. This is a phrase commonly used by clinicians to indicate that no medical intervention is considered necessary, when the degree of hearing loss does not exceed 25 decibels. It generally ignores the problems of thresholds more sensitive than the norm. However, it does not mean that auditory processing is unaffected and it can be a false comfort to many seeking reasons for educational and behavioural problems.

A distorted hearing profile with large peaks and troughs on the audiogram (see Fig 1) may affect a child when they are laying down the foundations of speech as it inhibits the correct perception of complex patterns of sound, such as contained in language.

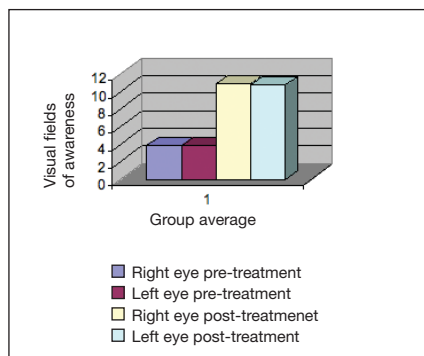
Laterality is another important factor in processing language. If the right ear is dominant, information passing through it reaches the left brain directly, the side where the majority of the population have their speech and language centres located. On the other hand, sound processed by the left ear suffers a timing



**Figure 2:** Typical visual fields of awareness (left eye) before and after LWS. Each circle represents 5 degrees. The coloured markings, clustered in the centre beforehand, have moved out across several circles.



**Figure 3:** Representing average percentage improvement levels for participants (left axis) from audiograms before, during and after therapy.



**Figure 4:** Group average visual fields left and right eye, pre- and post-treatment.

delay, which is seen in difficulties with speech and language, including stammering and stuttering. We therefore encourage right-ear dominance, which leads to faster processing.

### Importance of the visual fields of awareness

The Visual Fields of Awareness test measures where a client can identify a coloured target moving from the periphery along one of the axis towards the middle of the chart whilst fixating on the centre point. Four different colours are tested on each axis. For many people with learning and sensory difficulties, the visual fields are very restricted, which affects not just their vision but almost every aspect of their physical and mental functioning.

Many health disorders can be traced to problems related to the amount and quality of light reaching the mind-body system via the eyes. Light controls the body's inner clock or circadian system, which in turn influences many biological functions, including the timing of sleep, hormone production, sexual function, moods, the immune system and the ageing process. Stress, head injuries, emotional trauma and bad lighting can all result in a lack of photo-current flow in the brain.

Most people are now aware of the 'winter blues' and appreciate the re-energisation experienced after a holiday exposed to sunshine or snow. To keep

fit, we don't just need exercise, food, water and air: most important of all is exposure to natural light or, if we have to stay indoors, full spectrum lighting, because it is closest to natural light.

The low amount of photo-current in the brain is often due to reduced visual fields – a narrowing of the fields of vision – which permit less light in via the eyes. This inadequate light absorption can be part of the cause of many learning difficulties; for example, many dyslexics have poor visual processing, which can affect reading, spelling and memory skills. The body's ability to perceive light can be increased by stimulating the pathways that run from the retina at the back of the eye to the brain; this is what can be achieved with the Lightwave Stimulation programme.

### Non-invasive therapies improve sensory processing

Many people believe that the senses just work the way they do and cannot change without medical intervention. But every human being changes every day in some way and our senses are no exception. We can re-train the senses to improve their response to sensory input, thus improving ability and performance. The programmes we offer aim to do precisely that – change the way the person processes their sensory input.

From 15 years' experience of many clients presenting with many different 'labels', we know that this often leads to

a fundamental shift toward regaining control over their lives. Our sound and light interventions through the ears and the eyes not only improve our direct senses, they also affect the vestibular and proprioceptive systems. The programmes we most often use are:

- Auditory Integration Training (AIT)
- Lightwave Stimulation (LWS)

### Auditory Integration Training

AIT is a non-invasive, sound therapy developed by Dr Guy Bérard, a French ENT (ear, nose and throat) specialist. His research found a link between hearing dysfunction and many behavioural and learning problems, such as dyslexia, depression, hyperactivity, autism, poor memory and poor concentration.

AIT involves listening through headphones to modified music that is filtered through an electronic device, the Audio-kinetron. AIT is delivered during two half-hour sessions a day for 10 days. This process retrains the ears to hear in a more balanced manner, thus improving phonological awareness and listening skills. We seek to flatten the distorted pattern in the perception of sounds across the hearing range so that sounds may be heard evenly and perceived correctly.

Benefits are often rapid and may continue to develop over several months. Our experience indicates that, following AIT, children and adults become more responsive and eager to learn, with a corresponding improvement in both academic and social performance. Some who were non-verbal begin to speak.

### Lightwave Stimulation (LWS)

There are many forms of light therapy but we have found the most effective is Lightwave Stimulation developed by the American scientist, Dr John Downing. The technique uses pulsed, coloured light. Each of the 11 colours used has different energy characteristics and those for each session are chosen based on the assessment data. A single series of treatments consists of 20 sessions of 20 minutes each for children and 25 similar sessions for adults.

The aim of LWS therapy is to re-balance the sympathetic and parasympathetic sides of the autonomic nervous system. Widened visual fields increase the ability to absorb light energy and enhance stimulation of brain activity to help balance hormone production and bodily rhythms, bringing benefits in health and performance (Fig. 2). Those with physical problems, such as fatigue and tension, eating disorders, seasonal affective disorder (SAD) and depression have also been helped. It benefits people



struggling with dyslexia and other learning and physical difficulties.

### School project

The effectiveness of AIT and LWS is increasingly recognised by individual medical practitioners and appreciated by clients, parents and teachers. However, for various reasons very few research studies have been conducted on the effectiveness of these programmes. We were therefore particularly pleased to be invited to participate in a project as an opportunity to help a group of pupils in a large London secondary school.

We were asked to provide our treatment programmes in a school setting for a group of very bright boys who were failing academically and socially. The 16 participants, aged 11 to 16, all previously diagnosed with autistic spectrum disorder, several of whom were under threat of exclusion, were randomly divided into two groups: a target group to receive treatment and an untreated, control group. All participants were assessed, given their own personalized protocol and treatments given at school during school hours. The programmes consisted of 20 sessions of AIT and LWS.

It was anticipated that our interventions would benefit this group and to demonstrate this, we agreed to jointly monitor these pupils for a year.

Immediate improvements were seen in performance and attitude in a number of pupils in the target group, whilst no change was noted in the control group. Improvements in auditory, visual and sensory processing were measured during the final assessments. Over the following year parents, teachers, participants and peers reported additional improvements.

Participants in the target group also demonstrated that sensory improvements can significantly enhance behaviour and performance. An example of group improvements in audiogram and visual fields results is shown in Figs 3 and 4. However, group statistics and aggregate scores may conceal more than they reveal, especially when the sample is small. The charts are followed by a case study (Fig 5), which better illustrates the significance of improved sensory processing and the reality behind the numbers.

Our results also show considerable improvements in the visual fields of awareness.

Results of all the experimental tests were statistically significant. The results supported our hypothesis, together with anecdotal evidence from pupils, parents and teachers. The school concluded that the Centre's sound and light therapy had

## Case Study

### Feedback from Parents

- He doesn't flap so much if sirens or smoke alarm go off.
- More responsive to instructions.
- Field of vision seems wider peripheral vision improved, notices more in his surroundings; comments on details of surroundings, especially features of buildings.
- Does not stutter or stumble so much.
- Is able to read more quickly, reads with great pleasure, has started widening his reading material.
- Asks to read aloud when being driven to school.

### Feedback from School

- He is definitely more organised and motivated and every day has something positive to say about what is going on.
- Has also said he is less distressed by excessive noise and activity around him and generally finds it easier to get on with his work.
- He has become more articulate since the therapy.
- He has without question become more confident in expressing himself fluently and is becoming forever more literate.

**Figure 5:** Case study: 15-year-old boy presenting with significant hypersensitivity, articulation and major neuro-developmental difficulties.

been beneficial and improved all the pupils' social, emotional, behavioural and academic performance.

### Our passion

At The Sound Learning Centre we are proud of what we often achieve. It is a real delight to see the improvement in performance we are able to trigger: adults come out of depression, teenagers perform better at school, or self-harming behaviour disappears. Often the results are life-changing and transformational.

For many, the family dynamic also changes. Parents begin to have hope, hope that family life can be good. If a child starts to sleep normal hours, parents can get a good night's sleep. They emerge from a period of perpetual exhaustion and can more easily cope with their lives and, in particular, with their other children. The child with learning difficulties will not only start to make progress in school, but regain confidence and self-esteem and start to radiate happiness again.

Tears of happiness are not uncommon at our Centre, often from parents, children and quite often from the staff also. When a child starts to speak their first words, often after years of unsuccessful visits to doctors, hospitals and speech and language therapists, it is impossible not to be touched deeply by the fundamental changes that have been evoked in a child's life.

It is exciting that treatments that do not involve taking drugs or medical intervention can have such a profound impact; in fact, clients frequently come off drugs such as Ritalin or anti-psychotics. We encourage realistic expectations and always suggest clients research and question any solutions offered, including our own.

### Waking up society

Our passionate belief is that early identification of learning and sensory difficulties, followed by early intervention, is the key. Over the years we have seen how these two simple interventions can achieve significant and cost-effective improvements in social, emotional, behavioural and academic performance, benefiting the individual and their families. Our long-term aim is for these therapies to be better known by the general public, health and educational authorities and made widely available to those individuals with learning and sensory difficulties in order to benefit our whole society. ♡

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*Having trained with Dr Bérard, Pauline Allen specialises in neuro-developmental disorders and practises a range of sound and light therapies. She founded The Sound Learning Centre in 1994 to provide an holistic approach to learning difficulties and has also presented the Centre's work at international conferences. Tel: 020 8882 1060; [www.thesoundlearningcentre.co.uk](http://www.thesoundlearningcentre.co.uk).*